Competency in Neonatal Endotracheal Intubation: Mission Impossible?

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The Accreditation Council for Graduate Medical Education Program Requirements (PRs) for Pediatrics require that residents be able to competently perform neonatal endotracheal intubation (NET).[1] In this issue of *Pediatrics,* DeMeo et al[2] defined competency as a 75% likelihood of intubation success; only a minority of residents (23%) were able to achieve competency during the study period. Four cumulative NET successes were needed to achieve competency; the median number of NET opportunities for their subjects, however, was 3 (range: 1–13).

There are 2 lists of procedures in the current version of the PRs. The first list requires residents to "competently perform," and the second list requires "competent understanding." During the PR revision process, the Accreditation Council for Graduate Medical Education Residency Review Committee initially recommended that NET be moved to the second list of procedures. However, feedback from the pediatric community overwhelmingly urged the committee to move NET back to the first list. Advocates for preserving NET as a skill noted that some pediatricians will practice in remote areas, where they could be solely responsible for NET. Responding to the pediatric community, NET was moved back to the first list in the final version of the PRs that became effective July 1, 2013.

Despite no clear definition of "competency," most pediatric residents are clearly graduating without this skill. In reviewing our data on neonatal intubations between 2011 and 2013, we found incremental increases in success with intubation from postgraduate year (PGY)-1 to PGY-6 (pediatric interns to senior neonatal fellows). It was not until PGY-6 that neonatal fellows achieved success rates in NET similar to neonatal attending physicians. Neonatal fellows had an average of 58 NET attempts, compared with 2.5 attempts per pediatric resident.[3]

The major barrier to achieving competence in NET is lack of opportunity. Duty hour restrictions, fewer clinical rotations in the NICU, increased use of noninvasive respiratory support, and increased competition from other learners (eg, nurse practitioners, respiratory therapists) have led to fewer opportunities for NET by residents. Opportunities are increasingly reserved for individuals whose career will be NICU based. As is happening in many NICUs, the residents in the study by DeMeo et al[2] were excluded from attempting intubation in neonates $<$1000 g, and most NETs were performed in the NICU, with only 3% performed during the initial resuscitation; thus, residents were excluded from performing NET in the environment they are most likely to encounter in a pediatric practice.

With the transformation to competency-based education, 48 pediatric competencies and their associated milestones have been identified.[4] All procedures are included in a single competency. The milestone level achieved by trainees can be used by programs as formative assessment to adjust their curriculum to enhance skill acquisition. The pressures to achieve a high-level milestone in all

48 competencies will lead programs to prioritize clinical experiences. If NET competency is required by a minority of graduates, training will receive a low priority. Ideally, programs will use the individualized curriculum, described in the PRs, to provide the needed training for those who will require NET competency in their practice.[1] The individualized curriculum encompasses a limited period of time, and training innovations are needed that will accelerate the learning curves of trainees. DeMeo et al[2] note that there is an opportunity to improve the "quality of intubation attempts" through the use of video laryngoscopy or high-fidelity simulation.

One promising adjunct for learning is the use of expert modeling (EM). For learners to develop expertise, an expert's thought processes need to be modeled.[5] EM is based on the premise that a defining feature of expertise is unconscious competence that does not require cognitive monitoring and interaction. EM improves learners' unconscious competence by duplicating the beliefs, attitudes, mental processes, and physical activities that characterize expertise.[6,7] The external behavior can be observed directly and copied. Modeling forward-reasoning in conjunction with performing technical and behavioral skills may allow the learner to more completely grasp the skill set used in expert performance.[8]

Video depiction of expert performance has been used to improve skill acquisition and may prove useful in efforts to improve performance in NET.[9] Our results from the introduction of EM into Neonatal Resuscitation Program instruction suggests that learners demonstrate increased expertise in performing neonatal resuscitation. The technical, behavioral, and cognitive skills of an expert leading a neonatal resuscitation were captured on video. The video modeled the expert's forward-reasoning skills by using a voiceover of the expert's thought process at critical decision-making points. Residents who viewed the video during Neonatal Resuscitation Program training displayed an improvement in technical and behavioral skill acquisition.[10,11]

The goal of competency in NET for all pediatric residency graduates is unlikely to be achieved with our current training paradigm. However, there is hope that an individualized approach for those trainees most in need of this skill can be achieved through the use of complementary educational modalities to accelerate learning and enhance the educational value of each NET opportunity.

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